

## Masking tape

Patent number: AU2210599

Publication date: 1999-10-18

Inventor: TUORINIEMI VEIJO MATIAS

Applicant: VEIJO MATIAS TUORINIEMI

Classification:

- international:

- european:

Application number: AU19990022105D 19981231

Priority number(s): US19970070260P 19971231; WO1998US27891 19981231

Also published as:

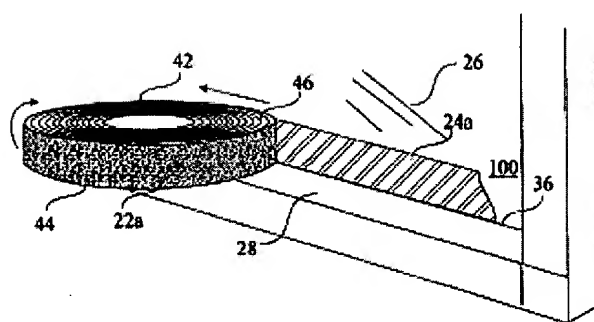


WO9948618 (A1)

Abstract not available for AU2210599

Abstract of correspondent: **WO9948618**

A window (26) is masked accurately by placing the side (44) of a tape roll (42) against a window frame (28) and pressing the outer rim (46) of the tape roll (42) against the window (26). Pressure bonds the adhesive (22a) to the window (26). The side (44) of the tape roll (42) is guided and supported against the window frame (28) and tape (100) is simultaneously unwound against the window (26). The outer longitudinal periphery of the tape (100) accurately follows the corner (36).



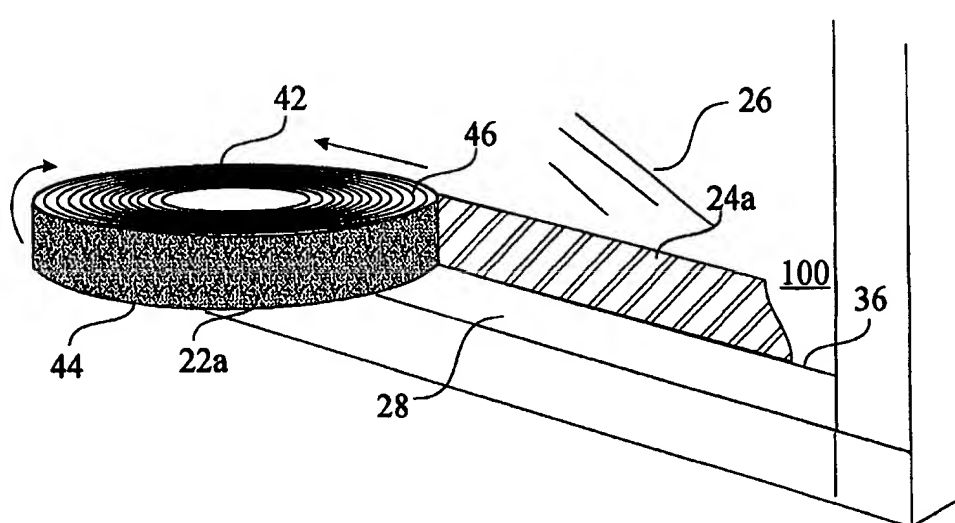
BEST AVAILABLE COPY



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification : <b>B05D 1/32, B32B 3/02, 3/04</b>	<b>A1</b>	(11) International Publication Number: <b>WO 99/48618</b> (43) International Publication Date: 30 September 1999 (30.09.99)
(21) International Application Number: PCT/US98/27891 (22) International Filing Date: 31 December 1998 (31.12.98) (30) Priority Data: 60/070,260                      31 December 1997 (31.12.97)      US (71)(72) Applicant and Inventor: TUORINIEMI, Veijo, Matias [FI/US]; 50 Horatio Street, #16, New York, NY 10014-1675 (US).	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>	

(54) Title: MASKING TAPE



## (57) Abstract

A window (26) is masked accurately by placing the side (44) of a tape roll (42) against a window frame (28) and pressing the outer rim (46) of the tape roll (42) against the window (26). Pressure bonds the adhesive (22a) to the window (26). The side (44) of the tape roll (42) is guided and supported against the window frame (28) and tape (100) is simultaneously unwound against the window (26). The outer longitudinal periphery of the tape (100) accurately follows the corner (36).

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

Patent Application of  
Veijo M. Tuoriniemi  
for

**MASKING TAPE**

This application claims priority from provisional application serial no 60/070,260 filed on December 31 1997.

**BACKGROUND -FIELD OF INVENTION**

This invention relates to masking tapes.

**BACKGROUND -PRIOR ART**

Lint removers having a adhesive outermost layer facing out of the roll are disclosed in U.S. patent 4,427,726 for Wolfrum, U.S. patent 4,546,011 for Wolfrum, U.S. patent 4,905,337 for McKay and U.S. patent 5,388,300 for Hickey. Lint removers are used to clean garments or analogous purposes by rolling the tape roll along the surface. Tape has a tacky adhesive layer which bonds the lint and removes it from clothes. The adhesive also bonds the tape to the backing of the next circumferential layer on a roll is usually so hard that is difficult to pull away the outer used layer. Lint remover web is usually readily formed to uniformly spaced, dispensable perforated or other way weakened portions

Embossed backings having a structured, reduced contact for pressure sensitive adhesive to adhere has been disclosed in U.S. patents 4,397,905 for Dettmer et al. Purpose of the structure is to provide an easy release for the adhesive when the tape is unwound from the roll.

Easy tearing film-backed masking tape is disclosed in U.S. patent 4,781,957 awarded to Josephine et al.. This resembles conventional creped paper-backed masking tape, but because of closely spaced randomly disposed, crosswise embossed valleys, the tape can be torn cleanly with fingers.

U.S. patent 4,358,494 for Saburo et al. is a paper-backed tape having a widthwise-stretched film lap-sealed on first side of the paper. A polyethylene is extruded and coated on the side of said film to form a release layer. Adhesive layer is formed to the second side of the backing paper.

U.S. patent 4,889,759 for Yamazaki discloses a thin masking paper for spray painting with a tape fixed to the edge of the paper. This invention cannot be rolled on surface straight from the roll and needs a dispenser to supply the tape. The masking paper is thinner than the tape and cannot support itself in form.

U.S. patent 5,654,055 for Cox et al. disclosed a masking tape with stiffer edge which is used to insert the edge under a molding or gasket. Method of masking is different from current disclosure.

U.S. patent 4,582,737 for Torgerson shows a Double surfaced adhesive tape where two masking tapes are combined together adhesive side facing to reverse directions. This cannot be used to mask corners and protect both surfaces of the corners as a tape disclosed in this application.

A type of flexible tape is described in U.S. patent 5,464,692 granted to Mortimer. Tape is suitable to conform to irregular curvatures and contours. However, the tape is unrolled a conventional way and patent does not disclose any time saving applying methods.

Different type of tapes have been invented, but the improvements have been made on the adhesive or the backing. Neither of these patents disclose a tape which can be applied on a surface by rolling it along the surface or where the pressure sensitive adhesive side faces out.

#### OBJECTS AND ADVANTAGES

This tape can be rolled off the roll more easily and also applied faster more accurately than conventional tapes without prior experience

#### DRAWING FIGURES

Fig. 1 shows a cross sectional view of the first embodiment of the tape.

Fig. 2 shows a method of dispensing a curved line of the masking tape.

Fig. 3 shows a method of dispensing the tape along a corner.

Fig. 4 shows a method of dispensing a straight line of the masking tape

Fig. 5a-c show the cross sectional view of the folded tape a) before folding, b) as folded and c) as unfolded against the working surface

Fig. 6a shows the masking tape with inward pleat unwound, unfolded and bonded to a corner.

Fig. 6b shows the masking tape with outward pleat unwound, unfolded and bonded to a planar vertical surface.

Fig. 6c shows the masking tape with outward pleat unwound, unfolded and bonded to corner of a printing screen and a screen frame

Fig. 6d shows the masking tape with outward pleat folded to guide the leaking matter out from the surface.

Fig. 6e shows the masking tape with outward pleat folded to collect the leaking matter.

Fig. 7a-b shows the cross sectional view of the folded tape with separate masking board a) as folded on a roll b) as unfolded against the working surface.

Fig. 8a shows a cross sectional view of the masking tape fixed on a surface and the masking strip folded up to provide a three dimensional guide.

Fig. 8b shows a cross sectional view of the masking tape with masking strip fixed to the screen and the strip folded over a screen frame and additional pressure sensitive adhesive layer fixed to the screen frame.

Fig. 9a-d shows optional ways to fold the tape of fig. 8 before winding the tape on a roll

Fig. 10 shows a cross sectional view of the fifth embodiment with a support fold and a antislipping fold folded outward.

Fig. 11a-f shows optional ways to fold the tape of fig. 10 before winding the tape on a roll.

Fig. 12 shows a cross sectional view of the sixth embodiment with a support fold and an antislipping fold folded inward.

Fig. 13a-g shows optional ways to fold the tape of fig. 12 before winding the tape on a roll.

Fig 14a shows an elevational view of a masking tape having a pressure sensitive adhesive on a margin.

Fig 14b shows an elevational view of a masking tape having a pressure sensitive adhesive on a margin and a easy release pressure sensitive adhesive are next to it.

Fig. 15a-15d show a method to use the tape shown in figures 14a and 14b.

Fig. 16a show a cross sectional view of a tape having a wider backing layer with margins overlapping both sides of a longitudinally running strip

Fig. 16b show a cross sectional view of the tape of fig. 16a having both overlapping margins turned in forming folds with adhesive layer facing out.

Fig. 16c show a cross sectional view of the tape of fig. 16a bonded to a corner.

Fig. 16d show a cross sectional view of the tape of fig. 16a bonded over a screen frame.

Fig. 16e show a cross sectional view of a tape having a wider backing layer with margins overlapping both sides of a longitudinally running strip and having a pre-formed, longitudinally running crease in predetermined position along which the strip can be folded double upon itself to form a pleat with generally planar folds that can be positioned to form a V-shape in use.

Fig. 17a shows a method of manufacturing the tape.

Fig. 17b show a method of manufacturing the tape.

## DESCRIPTION OF THE FIRST EMBODIMENT

Figure 1 shows a cross sectional view of the masking tape. The elongated strip of tape backing 20 has a predetermined width, substantially wide enough to mask the marginal surface portion of the object which is not to be painted or other way treated. The tape backing 20 has a pressure sensitive adhesive 22 covering a first surface and an antistick coating 24a covering a second surface providing an easy release from a roll.

In figure 2 the masking tape is rolled on a roll 42 the adhesive surface facing out. Tape can be unwound and applied by pressing the outer rim of the tape roll 46 against the working surface, bonding the pressure sensitive adhesive against the working surface and rolling the tape out along the working surface.

Tape can be applied to irregular curvatures and contours by providing the tape with a flexible backing layer. Irregular curvatures are masked by rolling the tape out along the edge of a predetermined irregular line as shown in figure 2. Making one type of flexible backing layer is described in U.S. Patent 5,464,692 for Mortimer J. Huber.

In figure 3 window 26 is masked accurately by placing the side of the tape roll 44 against a window frame 28 and pressing the outer rim of the tape roll against the window 26. Pressure bonds the adhesive 22a to the window. The side 44 of the tape roll is guided and supported against the window frame 28 and tape 100 is simultaneously unwound along the window. The outer longitudinal periphery of the tape 100 accurately follows the corner 36.

By having the pressure sensitive adhesive 22a on outer periphery of the tape roll, rolling the tape roll along the surface and applying the tape enables accurate masking in a fraction of the conventional working time. Term "periphery" refers to a line that forms the boundary of an area. Masking work can also be done accurately and quickly without prior experience. Corners, such as corner 36, shown in figure 3, are fast to mask with this new masking tape. The term "corner" is defined as the junction of two surfaces which meet and form an angle, preferably approximately 90 degrees, but other corners give sufficient support to the tape roll for easy masking.

Figure 4 shows how a straight edge guide can be achieved on a working surface by supporting the side of the tape roll against a supportive elongated object 33. Straight mask lines can be applied quickly and without requiring any further intervention with this new method. The supportive object is held against the working surface and the outer rim of the tape roll is kept against the surface under pressure, the adhesive is bonded to the working surface 38 and tape is rolled out along the surface. The pressure of the tape roll bonds the adhesive against the working surface 38 and rolling motion releases the tape from the roll 42.

## DESCRIPTION OF THE SECOND EMBODIMENT

Figures 5a, 5b and 5c show a second embodiment of the invention. Lower longitudinal margin 31 of the backing 20 of the tape is covered with pressure sensitive adhesive 22a. The margin 31 is folded backward doubling the backing layer upon itself. The margin 31 forms a longitudinally running pleat 34 and an edge 32. Term "edge" refers to a line of intersection of two surfaces oriented transverse to each other. The backing 20 of the tape is partially covered with release or antistick coating 24a which faces against the adhesive 22a when the tape is on a roll, enabling easy release (fig 5 b). The upper margin of the backing 20 of the tape can have an optional additional second pressure sensitive adhesive layer 22b fixing the longitudinal edge of the tape 100 and an antistick coating 24b on the reverse side of the backing 20 of the tape.

Figure 5c shows the masking tape bonded to a corner 36.

Figure 6a shows the masking tape 100 dispensed to the corner 36. The lower side 44 of the tape roll 42 is laid against the surface 38 and the outer rim of the tape roll is pushed against the opposite surface 40. The pleat 34 is unfolded and turned and pressed against the surface 38. The pressure sensitive adhesive 22a bonds the pleat 34 to the working surface 38. Upper part of the backing 20 of the tape is against the surface 40. The outermost, longitudinal peripheral line of the pleat 34 is on predetermined distance from the corner 36. The distance is depending on the width of the pleat 34.

Figure 6b shows the masking tape 100 wound on a roll 42 with the pleat 34 facing out. The outer rim of the tape roll 42 is kept against the surface 38 under pressure, the adhesive 22a on the outer surface of the pleat 34 is bonded to the working surface 38 and tape is rolled out and dispensed along it. The pressure of the tape roll 42 bonds the adhesive against the working surface and rolling motion releases the tape from the roll 42. The backing 20 is unfolded as desired.

The unfolded backing 20 prevents leakage of a matter on the other side of the tape. On a vertical surface tape 100 guides the leakage 41 out of the surface (Fig. 6d) or collects the leakage 41 to a inner corner 35 (Fig 6e).

This tape can also to be used to protect screen printing frames from ink during the printing process. The tape also prevents possible unexposed or uncovered screen mesh areas near the corner from leaking through the screen mesh. In screen printing the ink is on a planar screen defined by a screen frame. In order to protect the screen frame from ink printers usually use conventional tape. It takes a considerable amount of time to mask all four sides of the screen frame by using a conventional tape. The above described masking tape is convenient to handle and fast to fix.

Figure 6c shows a tape described in figure 6b dispensed to a corner of a screen frame 37 and a planar screen mesh 39. The side 44 of the tape roll 42 is placed against the screen frame 37. Outer rim of the tape roll 42 is pushed against the screen mesh 39,



adhesive 22a is bonded and the tape is rolled out along the screen mesh 39. Pressure sensitive adhesive 22a in the pleat 34 bonds the tape to the screen mesh 39. At the same time when the tape is unwound, the backing 20 of the tape is unfolded and turned against the screen frame 37. Printing ink is disposed on the mesh. The backing 20 protects the screen frames 37 from getting in the ink and adhesive 22a in pleat 34 secures the tape to the screen mesh.

In order to fix the upper longitudinal margin of the tape to the screen frame, tape can have an optional second pressure sensitive adhesive layer 22b (figs.5a-5c). This layer should cover at least partially the tape on the screen frame side in order to keep the upper longitudinal periphery of the tape against the frame.

#### DESCRIPTION OF THE THIRD EMBODIMENT

Figures 7a and 7b show an alternative embodiment where the tape is partially made out of masking paper, preferably out of cardboard. Cellulose backing stiff, pressed cardboard is more economical and environmentally friendly than plastics. Cardboard is thicker and stiffer and keeps in form better than usually thinner and more flexible polymeric tape backing. Cardboard is also faster to apply to the corner and it keeps standing against the supporting surface.

Figure 7a shows a folded masking tape having a cellulose backing strip 30. The backing 20 has a pressure sensitive adhesive layer 22a. The longitudinal margin of the tape 20 is bonded to the strip 30 by adhesive 22a. The tape 20 is folded backward upon the strip 30. Folding the tape forms a longitudinally running pleat 34 and an edge 32. The Tape has a adhesive layer 22a facing out from the center of the roll. Strip 30 has an antistick coating 24a facing the adhesive layer 22a when the tape is wound on a roll.

Tape can also have an optional pressure sensitive adhesive layer 22b to keep the upper peripheral edge of the masking tape 100 secured e.g. against the opposite surface of a corner. In a case the tape has an adhesive layer 22b, the masking strip 30 has a second antistick coating 24b preventing the adhesive layer 22b from fixing to the back of the masking strip 30 when the tape is on a roll.

#### DESCRIPTION OF THE FOURTH EMBODIMENT.

Figure 8a shows a further version of the masking tape shown in figures 7a and 7b. The masking tape 100 is bonded to the surface 38 with pressure sensitive adhesive 22a. The strip 30 has a longitudinally running pre-formed crease 50a along which the longitudinally running peripheral edge of the strip 30 is folded against the surface 38.

Folding the edge creates a support pleat 54. The peripheral edge of the support pleat 54 is fixed to the surface 38 by piece of a conventional tape 52.

Folded strip 30 forms a three dimensional block for e.g. paint, ink or other liquid substance. Three dimensional tape can protect the surface from drops; guides a vertically leaking paint or other substance to a desired direction, collects liquid substance or restricts an area.

Figure 8b shows the masking tape with a stiffener strip 30 folded over a screen frame 37.

Figures 9a-9c show different ways to fold the tape of figs.8a and 8b before winding it on a roll

#### DESCRIPTION OF THE FIFTH EMBODIMENT

The masking tape in figure 10 is similar to the masking tape shown in figure 8 except that the support fold 54 has an additional pre-formed crease 50b along which the peripheral longitudinally running margin of the fold 54 can be folded outward. Crease 50b is performed on the opposite side than crease 50a. The new longitudinally running fold forms an antislipping fold 56. The antislipping fold 56 has a pressure sensitive adhesive layer 22b on the side which faces the surface 38 when the fold 56 is turned outward like shown in figure 10. Antislipping fold 56 is bonded to the surface 38 by pressure sensitive adhesive 22b. When the tape is on a roll the pressure sensitive adhesive 22b faces to the antistick coating 24b.

Masking tape can be wound to a dispensing roll either with the pressure sensitive adhesive 22a facing out or in. In preferred version the adhesive layer 22a faces out enabling dispensing by unwinding the roll against the working surface.

Figures 11b-11f show different ways to fold the tape in fig. 10 before winding it to a roll. The position of the antistick coating varies depending the way the masking tape is folded.

#### DESCRIPTION OF THE SIXTH EMBODIMENT

The figure 12 shows a version of the masking tape having the antislipping fold 56 folded inward. Turning the tape inward forms a sturdy triangular structure blocking the inks, paints or other matter from escaping. This masking tape version has a pre-formed crease 50b on the same side as crease 50a. The pressure sensitive adhesive layer 22b is on the opposite side of the antislipping fold 56 than it is in figure 10.

Figures 13a-13g show different winding and fold configurations. Antistick coating 24 enables the release of the tape from a roll. Placement of the antistick coating depends on the way the tape is folded before winding it on a roll.

## DESCRIPTION OF THE SEVENTH EMBODIMENT

Figures 14a show a version of a masking tape which can be fixed to protect the surface and a masking paper can be added under the tape to provide additional wide area protection when e.g. spray paints are used.

The backing 20 has a pressure sensitive adhesive layer 22a covering first longitudinal margin of the tape and a antistick coating 24a on the other side of the backing layer 20 facing the adhesive 22a when the tape is on a roll.

As shown in figure 14b the backing 20 can have an additional easy release pressure sensitive adhesive area 22c next to the adhesive 22a. Easy release adhesive 22c covers at least partially the area from the adhesive 22a covered margin to the other longitudinal edge of the tape.

Easy release can be provided by partially depositing the same pressure sensitive adhesive as used for layer 22a. Also a lower tackier adhesive can be used to covering the area at least partially.

A new method to use the tape is described in figure 15a-15d. The tape is fixed first on a surface 26 as to provide a masking line 57 (Fig. 15a). The longitudinal margin with pressure sensitive adhesive is bonded to the surface 26. The opposite longitudinal margin is lifted up and the pressure sensitive adhesive layer 22a is partially unbonded and exposed or alternatively the easy release pressure sensitive adhesive area is exposed (fig. 15b). An additional masking paper is placed between the surface 26 and pressure sensitive adhesive to provide wider cover of the surface (Fig. 15c). The additional masking paper is bonded to the masking tape 100 by pressing the pressure sensitive adhesive 22a or 22c against the masking paper. (Fig 15d)

## DESCRIPTION OF THE EIGHT EMBODIMENT

Figure 17a shows an embodiment where the wider backing 20 overlaps both longitudinal margins of the strip 30. The tape does not have a possibly leaking joints between the backing 20 and the strip 30 since the backing covers all the surface of the tape.

The masking strip 30 does not need an additional second adhesive layer since the overlapping margins of the backing 20 bond both longitudinal peripheries of the tape to the working surface.

Figure 17b shows a way to fold the overlapping margins of the backing layer. Both or either margins can be folded before winding the tape on a roll. Folded tape can be used similar way than tape shown in figures 5a-5c, 6a-6e, 7a-7b and 8b. Tape can be wound on a roll either adhesive side facing out of the roll or adhesive facing in.

Antistick coating 24a on the back side the strip 30 provides easy release for the adhesive of the tape from the roll.

If either one of the overlapping margins are not folded before winding on a roll the adhesive layer 22a faces the backing 20 when the tape is on a roll. Opposite side of the backing having no adhesive provides also an antistick or easy release coating, which it was given before winding the tape on a master roll. The same coating provides release for the unfolded margin. (in general, coating is not shown in figures).

Figure 16c shows how to bond the tape to the corner of working surfaces like in figures 5c, 6a, 6c. Same methods can be used than with previous embodiments.

Figure 16d shows the tape bonded over a screen frame like in fig. 8b

Figure 16e shows a structurally similar tape as in figure 8a where the strip 30 has a pre-formed crease 50, along which the tape can be folded double upon itself to form a pleat with generally planar first and second regions that can be positioned to form a V-shape in use.

Tape in figure 16e works same way than the tape in figure 10. It can be bonded to the surface 38 from both longitudinal margins by the adhesive 22a.

#### CONCLUSION, RAMIFICATIONS AND SCOPE

The backing of the tape is available from most commercial manufacturers like 3M, Armac or American tape. The components of the laminated and unlaminated masking paper or cardboard are available from many different sources.

Several different materials for backing 20 can be used depending the application where the tape is used.

A representative, non-limiting list of useful backing materials includes;

- paper with smooth or cropped side;
- treated, untreated or surface coated fabric like cotton cellulose, polyamide or fiberglass;
- films like soft PVC, hard PVC, hydrated cellulose, polyester, polypropylene (PP), polyethylene (PE), polyamide and aluminum;
- foams like polyurethane, polyethylene, PVC and ethylene-propylene diene monomer (EPDM);
- fleece and;
- different laminates comprising two or more material to archive better overall characteristics.

Many different types of adhesives can be used. Materials are dependent upon the environmental conditions in which they are being used.

Synthetic and natural rubber based pressure sensitive adhesives provide a good adhesion upon contact, easy peel-off and good adhesion on critical substrates such as polypropylene or polyethylene.

Acrylics are available in solvents or water based dispersions. Pure and modified acrylic based pressure sensitive adhesives have excellent low and high temperature performance. Acrylics are resistance to aging, UV-radiation and chemicals. Acrylics provide a consistent release tension, they have excellent clarity and provide a clear, non yellowish background for printing.

Silicone adhesives provide a good resistance to heat and aging. Thermoplastics are solvent free environmentally friendly synthetic resins.

The properties of the adhesives are a function of their constituents. Although above mentioned adhesive types give a representative examples, also other types of pressure sensitive adhesive can be used.

#### MANUFACTURING THE TAPE

Figure 17a shows a method of manufacturing a masking tape. The master tape is rolled out from the tape backing master roll 58 and the stiffener material is rolled out from a stiffener material master roll 60.

Optional second pressure sensitive adhesive layer and antistick layer is added to the stiffener material on spray station 61. Layer can be added by spraying or rolling or by using other method know in art. Spray station is not needed if needed adhesive or antistick layers are readily provided in stiffener material.

Guiding roll 62 feeds the masking cardboard into slicer 64, which slices the cardboard to longitudinal strips 30.

An optional creaser 68 presses a longitudinal crease to the cardboard. Crease is a thinner area along which the cardboard can be folded easily and accurately. After the creaser 68 strip folder 70 folds the masking strips 30 from desired position(s) forming parallel pleats.

Simultaneously the tape from master tape roll 58 is cut to desired widths in slicer 66. The backings of the tape 20 are folded in folder 72.

The backing 20 and the masking strip 30 are combined between presser rolls 74a and 74b. Presser rolls 74 press the margins of the tape 20 and the margins of the strips 30 by using the pressure sensitive adhesive layer of the tape 20.

After joining the backing 20 and the masking strip 30 the tape is wound to rolls 76 to be used.

Figure 17b shows an alternative method to make a masking tape. The process is otherwise similar to the process described in figure 16a, but the tape backing folder 72 is placed behind the presser rolls 74. In this alternative process the tape 20 is folded after it is bonded to masking strips 30. In some cases the tape 20 is easier to fold and less jamming occurs when it is joined to the stiffer masking strip 30 before it is folded.

## LIST OF REFERENCE NUMERALS

- 20 backing of the tape
- 22a first pressure sensitive adhesive layer
- 22b second pressure sensitive adhesive layer
- 22c easy release pressure sensitive adhesive layer
- 24a release or antistick coating
- 24b release or antistick coating
- 26 window
- 28 window frame
- 30 masking strip
- 31 longitudinal margin
- 33 elongated object
- 32 edge
- 34 pleat
- 35 corner of the tape
- 36 corner of working surfaces
- 37 screen frame
- 38 working surface
- 39 screen mesh
- 40 second working surface
- 41 leakage
- 42 tape roll
- 44 lower side of the tape roll
- 46 upper side of the tape roll
- 48 peel-off outermost layer with release or antistick coating
- 50a pre-formed crease
- 50b pre-formed crease
- 52 conventional tape
- 54 support fold
- 56 atislipping fold
- 57 masking line
- 58 tape backing master roll
- 59 masking paper
- 60 stiffener material master roll
- 61 spray stations
- 62 guiding roll
- 64 tape backing slicer

- 66 stiffener material slicer
- 68 creaser
- 70 strip folder
- 72 tape backing folder
- 74 presser rolls
- 100 masking tape

I claim

1 A masking tape having a predetermined width and being suitable to mask a surface comprising:

- a) an elongated backing layer having first and second major surfaces;
  - b) said first surface having as an outermost layer a pressure sensitive adhesive covering said first side at least partially.
  - c) said second surface of said backing layer surface having thereon an antistick coating, covering said first side at least partially, providing an easy release of said pressure sensitive adhesive ; and
- said masking tape being wound on a roll wherein said pressure sensitive adhesive layer faces outward from a center of the roll.

2 A method of applying said masking tape of claim 1 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive with said surface and unwinding the tape along said surface. [[[fig. 2]]]

3 A method of applying said masking tape of claim 1 on a corner by supporting a side of said roll against a first surface of a corner and by pressing the outer rim of said roll against a second surface; bonding said pressure sensitive adhesive to said second surface and unwinding the tape along said second surface while simultaneously guiding said roll against said first surface. [[[fig. 3 and fig. 4]]]

4 The masking tape of claim 1 having said elongated backing layer folded double upon itself of predetermined width from a longitudinal peripheral edge, forming a longitudinally running pleat; said pressure sensitive adhesive covering the outer surface of said pleat and said antistick coating facing said pressure sensitive adhesive when said tape is in a roll.

[[[fig 5a-c]]]

said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[fig. 6b-6c]]]

5 The masking tape of claim 4 being wound on a roll wherein said pressure sensitive adhesive coating faces inward to the center of the roll. [[[fig. 6a]]]

6 The masking tape of claim 4 having a second pressure sensitive adhesive layer covering at least partially the opposite, longitudinally running margin, being on the same side of the backing than said pressure sensitive adhesive layer of said pleat when said backing is unfolded [[[figs 5a-5c]]]



100 The masking tape of claim 6 further comprising a second antistick coating covering at least partially said second surface of said backing and facing said second pressure sensitive adhesive when said tape is in a roll. [[[fig 5a-c]]]

7 The masking tape of claim 1 having said pressure sensitive adhesive covering the longitudinal margin of predetermined width of said first surface and said antistick coating covering the opposite longitudinal margin of said second surface of said backing layer, said antistick coating facing said pressure sensitive adhesive when said tape is in a roll; and said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[Fig 14a]]]

8 The masking tape of claim 7 being wound on a roll wherein said pressure sensitive adhesive coating faces inward to the center of the roll.

9 The masking tape of claim 7 wherein a second layer of pressure sensitive adhesive at least partially covers the rest of said first surface so as to provide a relatively easier releasing area compared to said first mentioned adhesive. [[[fig 14b]]]

10 A method of applying said masking tape of claim 7 on a surface by; bonding a longitudinal margin of said pressure sensitive adhesive to said surface and unwinding the tape along said surface; lifting the opposite longitudinal margin of said backing of the tape; releasing said second pressure sensitive adhesive partially from said working surface and exposing said adhesive; placing a masking paper between said second adhesive and a working surface; and bonding said masking paper to said second adhesive. [[[15 a-15d]]]

11 The masking tape of claim 10 being wound on a roll wherein said first mentioned and said second mentioned pressure sensitive adhesives face inward from the center of the roll

12 The masking tape of claim 1 having said elongated backing layer folded double upon itself of predetermined width from a first longitudinal peripheral edge, forming a longitudinally running pleat;

a second elongated strip having a substantially higher stiffness than said backing layer and having a first major surface at least partially covered with an antistick coating;

## 13

at least a longitudinal margin of a second major side of said strip extending substantially to a longitudinal periphery of said second layer, being laminated to a longitudinal margin of said backing layer by said pressure sensitive adhesive of said backing layer; and,  
said antistick coating facing said pressure sensitive adhesive when said tape is on a roll; and  
said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[figs. 7a-7b]]]

13 The masking tape of claim 12 being wound on a roll wherein said pressure sensitive adhesive coating faces inward to the center of the roll. [[[figs. 7a-7b]]]

14 The masking tape of claim 12 wherein a masking strip that is relatively stiff compared to said backing layer is bonded from its longitudinal margin to a longitudinal margin of said backing layer by said pressure sensitive adhesive;  
said masking strip has a pre-formed, longitudinally running crease in predetermined position along which said strip can be folded double upon itself to form a pleat with generally planar first and second regions that can be positioned to form a V-shape in use;  
said pressure sensitive adhesive is on the outer surface of said pleat; and  
said antistick coating faces said pressure sensitive adhesive when said tape is on a roll;  
said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[Fig 9a ]]]

15 The masking tape of claim 14 being wound on a roll wherein said pressure sensitive adhesive coating faces inward from the center of the roll

16 A method of applying said masking tape of claim 14 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive with said surface, unwinding the tape along said surface, folding said strip along said longitudinally running crease, and positioning said first and second regions to form a V-shape.

17 The masking tape of claim 14 having a second layer of pressure sensitive adhesive covering at least partially the outermost pleat of said strip being on the same side of said masking tape than said first pressure sensitive adhesive layer when said masking tape is opened straight;  
and an antistick coating providing an easy release of said second pressure sensitive adhesive layer covering the part of the tape facing said second pressure sensitive adhesive when said masking tape is wound on a roll.

14

18 The masking tape of claim 1 wherein the backing layer has a fold of predetermined width from a first longitudinal peripheral edge forming a longitudinally running pleat; and a masking strip is bonded from its longitudinal edge to a second longitudinal peripheral edge of said fold by said pressure sensitive adhesive  
said masking strip has a pre-formed, longitudinally running crease in predetermined position along which said strip can be folded double upon itself  
to form a pleat with generally planar first and second regions that can be positioned to form a V shape in use;  
said pressure sensitive adhesive is on the outer surface of said pleat; and  
said antistick coating faces said pressure sensitive adhesive when said tape is on a roll;  
said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[fig 9b]]]

19 The masking tape of claim 18 being wound on a roll wherein said pressure sensitive adhesive coating faces inward from the center of the roll

20 A method of applying said masking tape of claim 18 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive with said surface, unwinding the tape along said surface, opening the pleat of said backing layer and the folding of said strip along said longitudinally running crease, and positioning said first and second generally planar regions to form a V-shape.

21 The masking tape of claim 18 having a second pressure sensitive adhesive layer covering at least partially the outermost pleat of said strip being on the same side of said masking tape as said first pressure sensitive adhesive layer when said masking tape is initially unwound from a roll.

and an antistick coating providing an easy release of said second pressure sensitive adhesive layer covering the part of the tape facing said second pressure sensitive adhesive layer when said masking tape is wound on a roll;

22 The masking tape of claim 1 wherein the backing layer has a fold of predetermined width on a first longitudinal peripheral edge forming a longitudinally running pleat; and a masking strip is bonded from its longitudinal edge to a second longitudinal peripheral edge of said fold by said pressure sensitive adhesive  
said masking strip is folded longitudinally double upon itself from predetermined position to form a pleat with first and second generally planar regions that can be positioned to form a V-shape in use;

said pressure sensitive adhesive is on the outer surface of said pleat; and  
said antistick coating faces said pressure sensitive adhesive when said tape is on a roll;

## 15

said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[ fig 9d]]]

23 The masking tape of claim 22 being wound on a roll wherein said pressure sensitive adhesive coating faces inward from the center of the roll

24 A method of applying said masking tape of claim 22 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive to said surface, unwinding the tape along said surface, opening the pleat of said backing layer and opening the fold of said strip to respective angles.

25 The masking tape of claim 22 having a second pressure sensitive adhesive layer covering at least partially the outermost pleat of said strip being on the same side of said masking tape as said first pressure sensitive adhesive layer when said masking tape is initially unwound from a roll;  
and an antistick coating providing an easy release of said second pressure sensitive adhesive covering the part of the tape facing said second pressure sensitive adhesive when said masking tape is wound on a roll;

26 The masking tape of claim 1 wherein a masking strip is bonded from its longitudinal margin to a longitudinal peripheral margin of said backing layer by said pressure sensitive adhesive;  
said masking strip has two relatively thin, longitudinally running crease regions along which said strip can be respectively folded upon itself to form a pleat with first and second generally planar regions that can be positioned to form a V-shape in use;  
and having a second pressure sensitive adhesive covering at least partially the outermost pleat of said strip being on the same side of said masking tape as said first pressure sensitive adhesive layer when said masking tape is initially unwound from a roll;  
and an antistick coating providing an easy release of said second pressure sensitive adhesive layer covering the part of the tape facing said second pressure sensitive adhesive when said masking tape is wound on a roll;  
said pressure sensitive adhesive covers the outer surface of said pleat; and  
said antistick coating faces said pressure sensitive adhesive when said tape is on a roll;  
said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[fig 11a, 11d -]]]

27 The masking tape of claim 26 being wound on a roll wherein said pressure sensitive adhesive faces inward from the center of the roll

28 The masking tape of claim 26 wherein said second pressure sensitive adhesive covers at least partially the outermost pleat of said strip being on the opposite side of said masking tape as said first pressure sensitive adhesive when said masking tape is initially unwound from a roll.

29 A method of applying said masking tape of claim 26 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive to said surface, unwinding the tape along said surface, folding said strip along said longitudinally running creases, and folding the backing layer from said longitudinal margin and opening the fold of said strip to respective angles.

30 The masking tape of claim 1 wherein the backing layer has a fold of predetermined width from a first longitudinal peripheral edge forming a longitudinally running pleat; and a masking strip bonded from its longitudinal edge to a second peripheral edge of said fold by said pressure sensitive adhesive;  
said masking strip has two relatively thin, longitudinally running crease regions along which said strip can be respectively folded upon itself to form a pleat with first and second generally planar regions that can be positioned to form a V-shape in use;  
and having a second layer of pressure sensitive adhesive covering at least partially the outermost pleat of said strip being on the same side of said masking tape as said first pressure sensitive adhesive layer when said masking tape is initially unwound from a roll;  
and an antistick coating providing an easy release of said second pressure sensitive adhesive covering the part of the tape facing said second pressure sensitive adhesive layer when said masking tape is wound on a roll;  
said pressure sensitive adhesive covers the outer surface of said pleat; and  
said antistick coating faces said pressure sensitive adhesive when said tape is on a roll;  
said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[figs. 11b]]]

31 The masking tape of claim 30 being wound on a roll wherein said pressure sensitive adhesive faces inward from the center of the roll

32 The masking tape of claim 30 wherein said second pressure sensitive adhesive covers at least partially the outermost pleat of said strip being on the opposite side of said masking tape than said first pressure sensitive adhesive layer when said masking tape is initially unwound from a roll.

33 A method of applying said masking tape of claim 30 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive to said surface, unwinding the tape along said surface, folding said strip along said longitudinally running creases, opening the pleat of said backing layer and opening the fold of said strip to respective angles.

34 The masking tape of claim 1 wherein the backing layer has a fold of predetermined width from a first longitudinal peripheral edge forming a longitudinally running pleat; and a masking strip bonded from its longitudinal edge to a second peripheral edge of said fold by said pressure sensitive adhesive;  
said masking strip is folded longitudinally upon itself from predetermined positions to form a pleat with first and second generally planar regions that can be positioned to form a V-shape in use;  
and having a second pressure sensitive adhesive covering at least partially the outermost pleat of said strip being on the same side of said masking tape as said first pressure sensitive adhesive when said masking tape is initially unwound from a roll;  
and an antistick coating providing an easy release of said second pressure sensitive adhesive covering the part of the tape facing said second pressure sensitive adhesive layer when said masking tape is wound on a roll;  
said pressure sensitive adhesive covers the outer surface of said pleat; and  
said antistick coating faces said pressure sensitive adhesive when said tape is on a roll;  
said masking tape being wound on a roll wherein said pressure sensitive adhesive coating faces outward from the center of the roll. [[[figs. 11b, 11c, 11e, 11f]]]

35 The masking tape of claim 34 being wound on a roll wherein said pressure sensitive adhesive coating faces inward from the center of the roll

36 The masking tape of claim 34 wherein said second pressure sensitive adhesive covers at least partially the outermost pleat of said strip being on the opposite side of said masking tape than said first pressure sensitive adhesive when said masking tape is initially unwound from a roll.

37 A method of applying said masking tape of claim 34 on a surface by pressing the outer rim of said roll against a surface; bonding said pressure sensitive adhesive to said surface, unwinding the tape along said surface, opening the pleat of said backing layer and opening the fold of said strip to respective angles.

## 18

38 The masking tape of claim 14, wherein said masking strip further includes a generally planar third region which adjoins said second region, supports the positioning of said second region in said V shape, and has means for bonding to a work surface.

39 The masking tape of claim 38 wherein said second and third regions are so constructed that said third region bends towards said first region when said first and second regions form a V shape in use.

40 The masking tape of claim 38 wherein said second and third regions are so constructed that said third region bends away from said first region when said first and second regions form a V shape in use.

41 The masking tape of claim 1, wherein a masking strip that is relatively stiff compared to said backing layer is longitudinally bonded to said backing layer by said pressure sensitive adhesive;

A said backing layer being wider than said strip so that both longitudinal margins of said backing layer overlap said strip. [[[17a]]]

42 The masking tape of claim 39 wherein at least one of said overlapping margins is turned in forming a pleat having said pressure sensitive adhesive facing out and said strip having said antistick coating facing said pressure sensitive adhesive when said tape is on a roll; said masking tape being wound on a roll wherein said pressure sensitive adhesive faces outward from the center of the roll. [[[17b, 17c]]]

43 The masking tape of claim 40 being wound on a roll wherein said pressure sensitive adhesive also faces inward from the center of the roll. . [[[17b, 17c]]]

44 The masking tape of claim 39 wherein said masking strip has a pre-formed, longitudinally running crease in predetermined position along which said strip can be folded double upon itself to form a pleat with generally planar first and second regions that can be positioned to form a V-shape in use. [[[17e]]]

1/19

Fig. 1

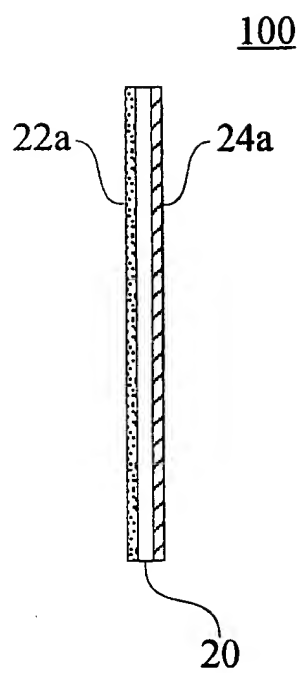




Fig. 2

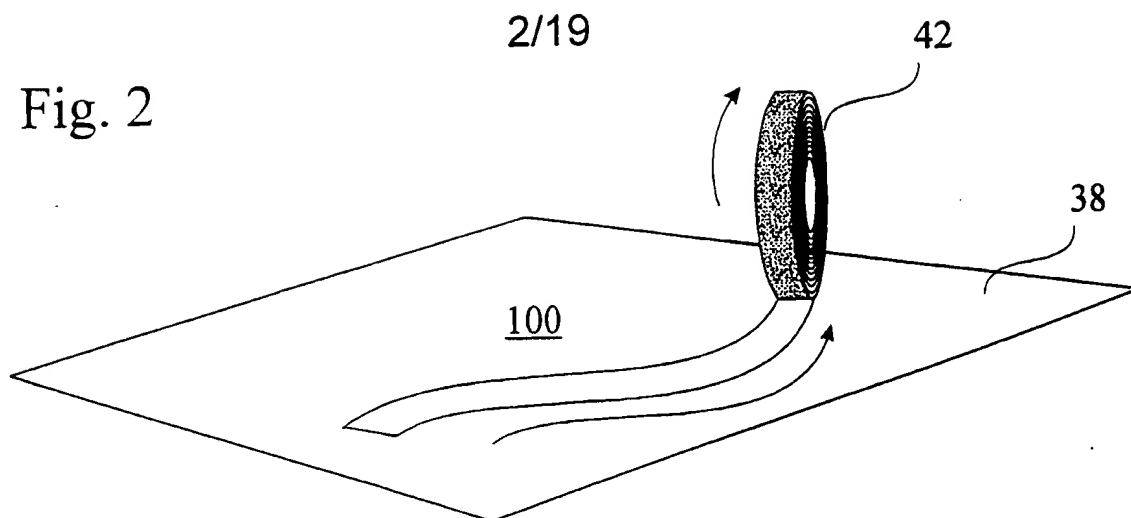


Fig. 3

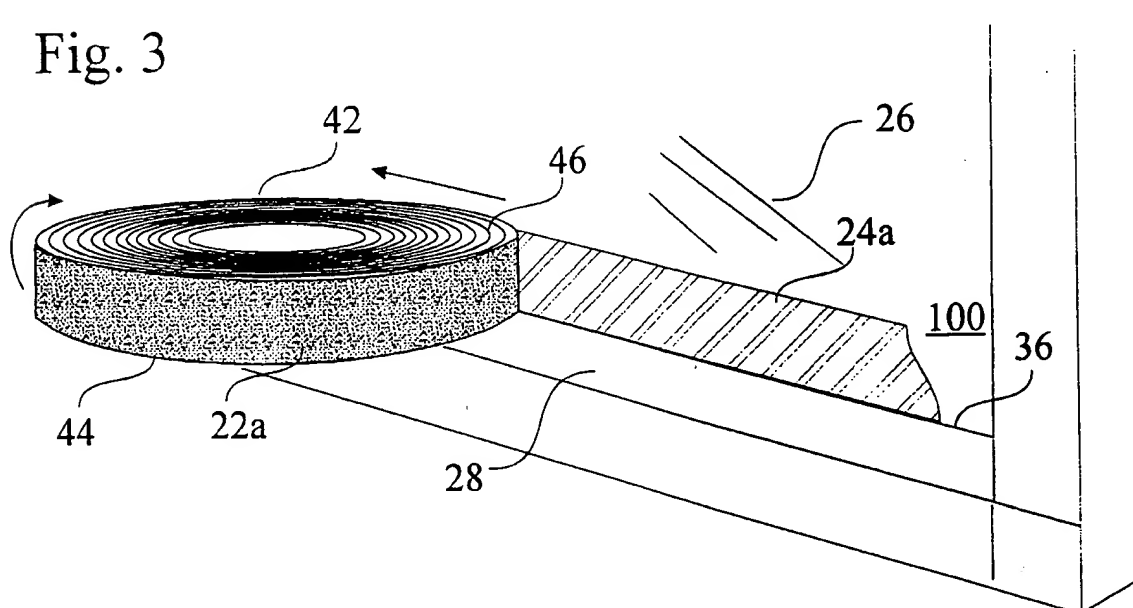
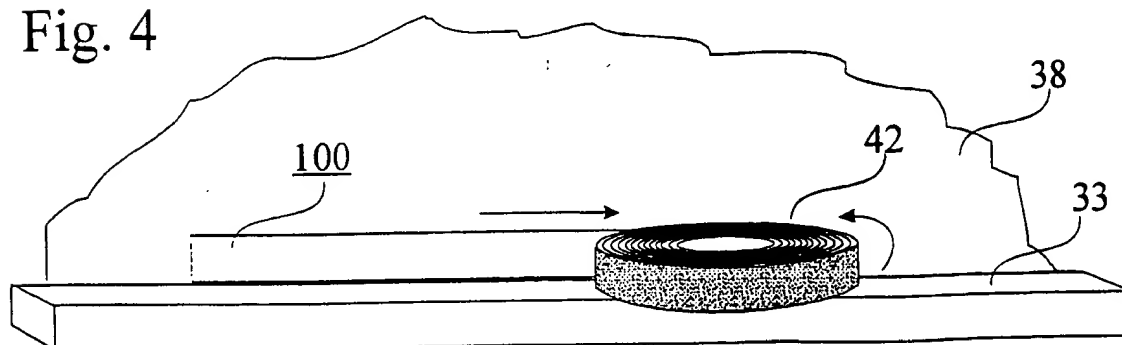


Fig. 4



3/19

Fig. 5a

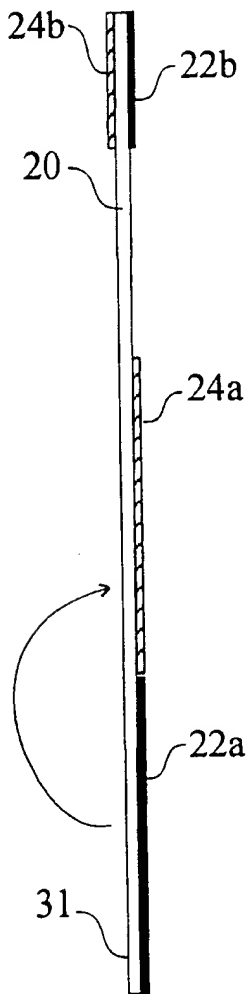


Fig. 5b

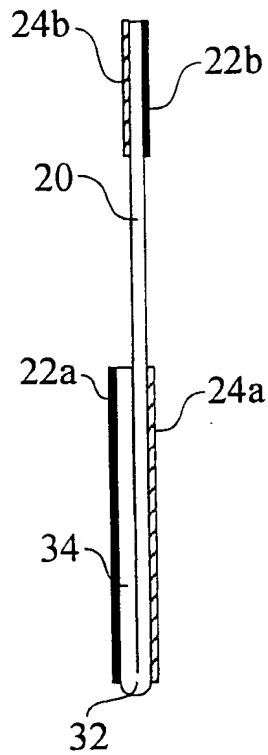


Fig. 5c

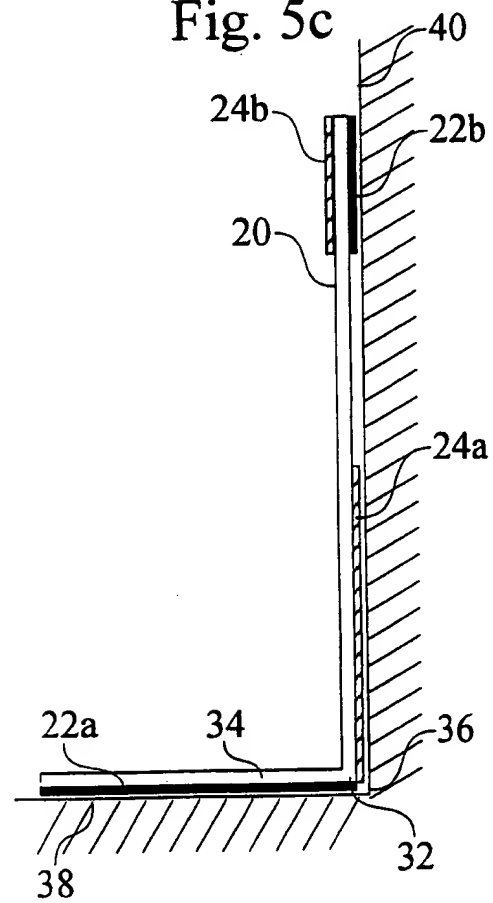
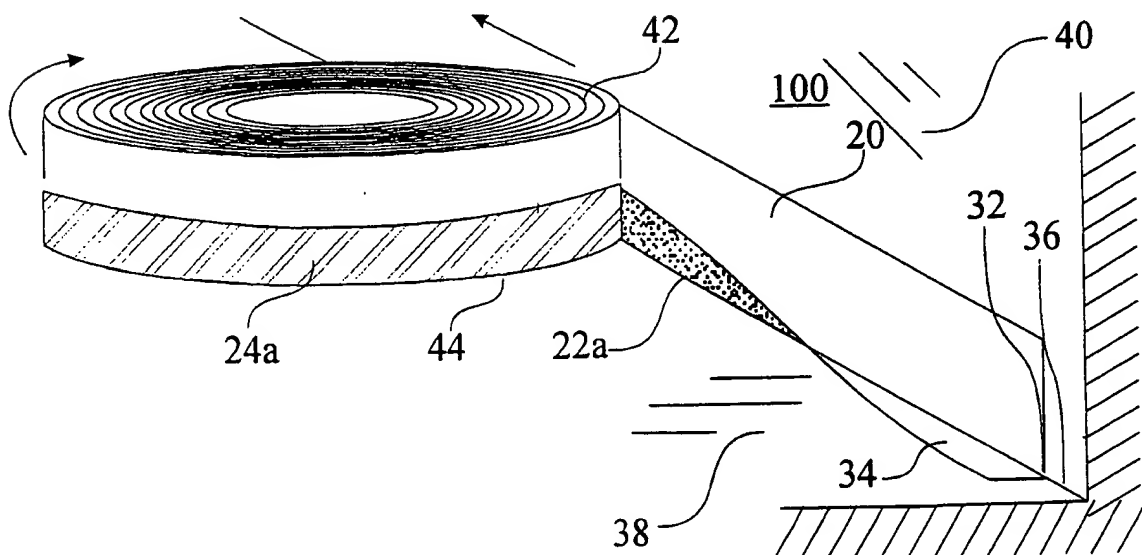


Fig. 6a



4/19

Fig. 6b

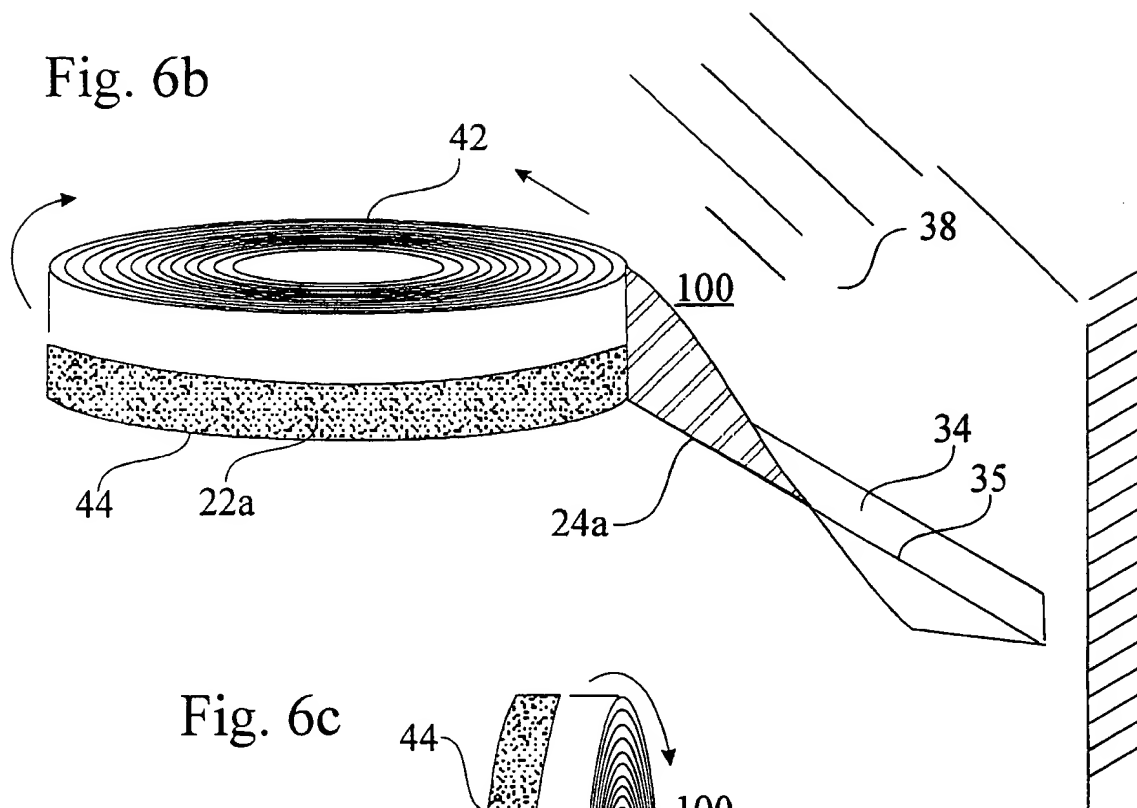
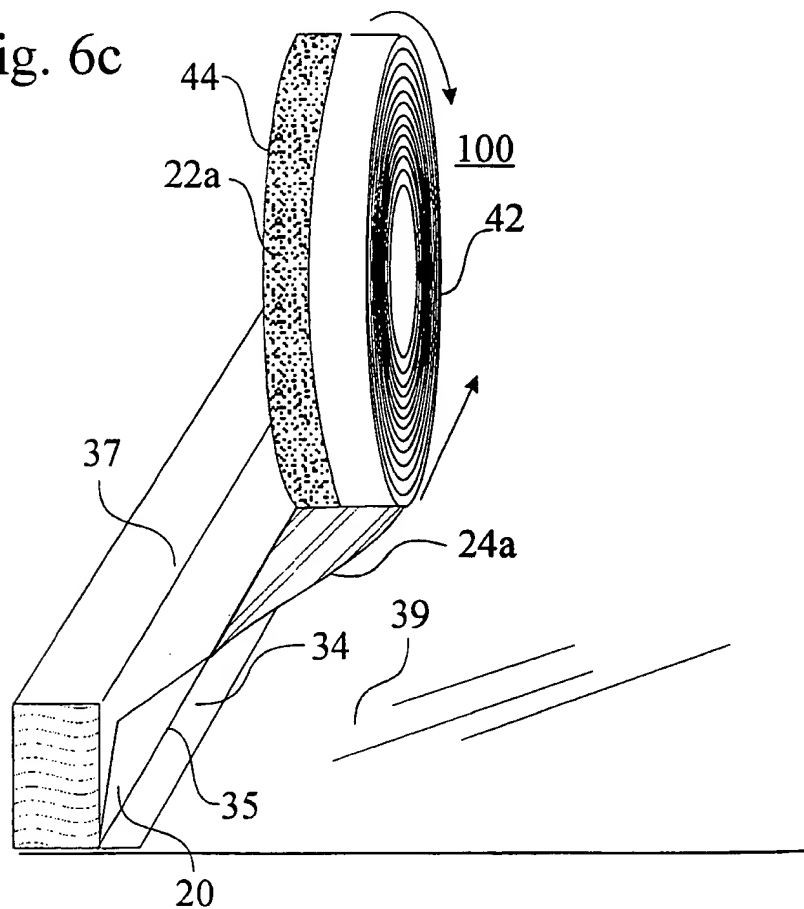


Fig. 6c



5/19

Fig. 6d

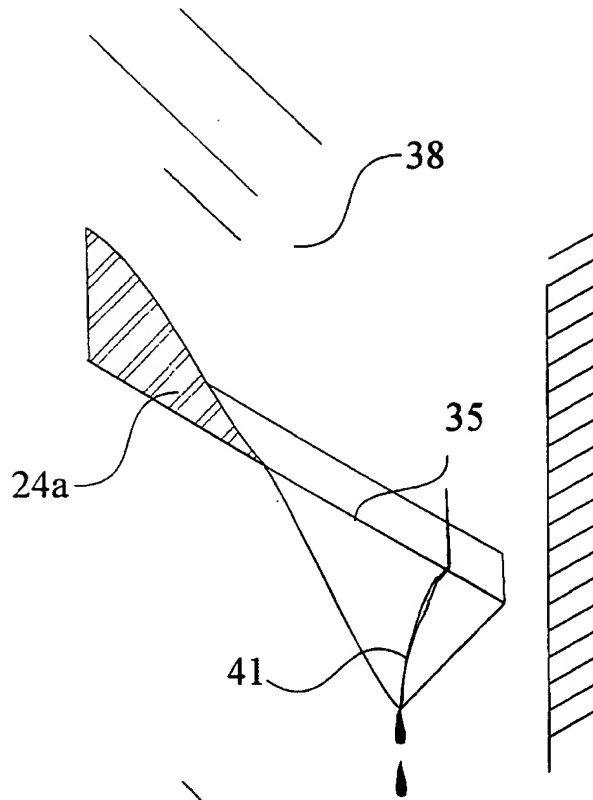
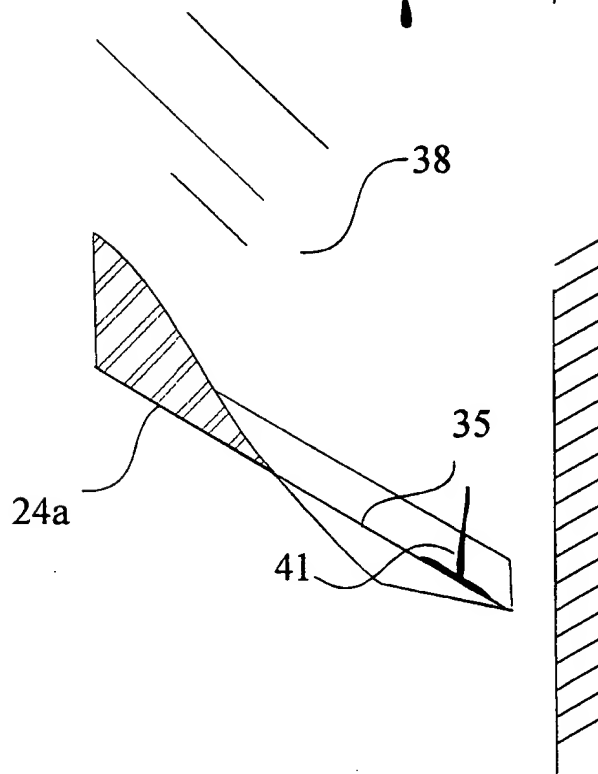


Fig. 6e



6/19

Fig. 7a

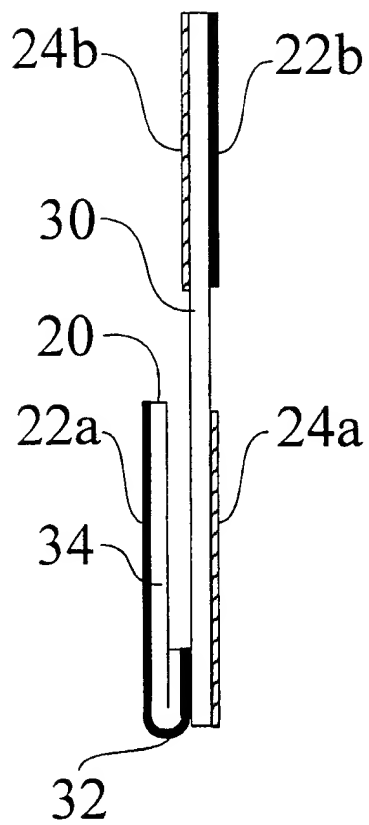
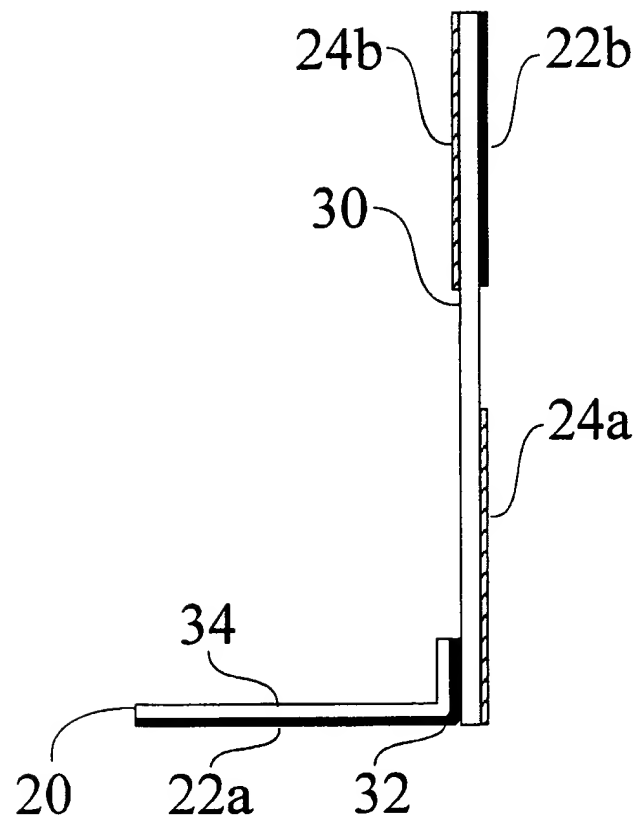


Fig. 7b



7/19

Fig. 8a

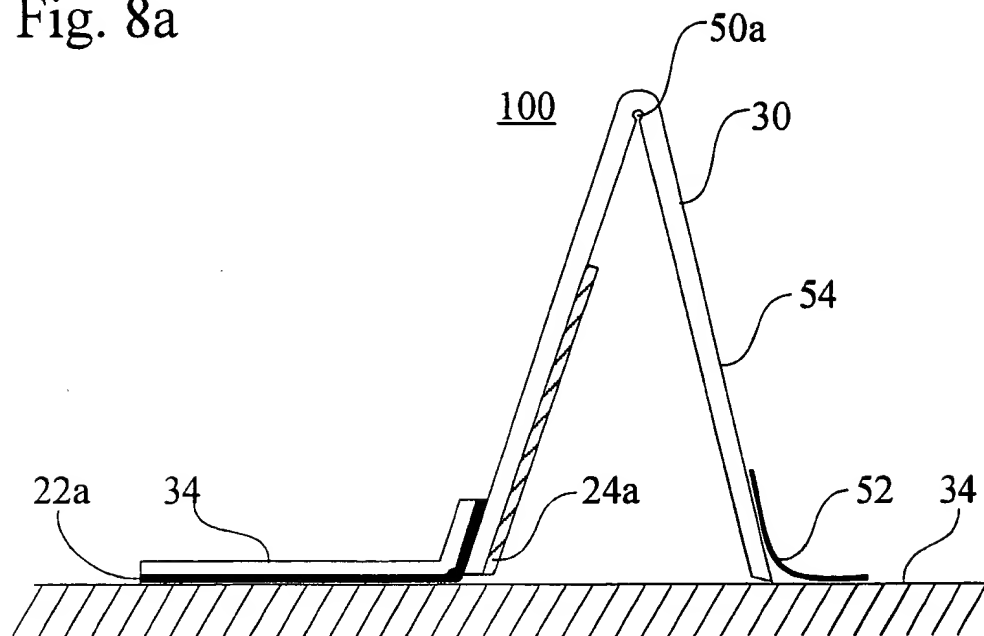


Fig. 8b

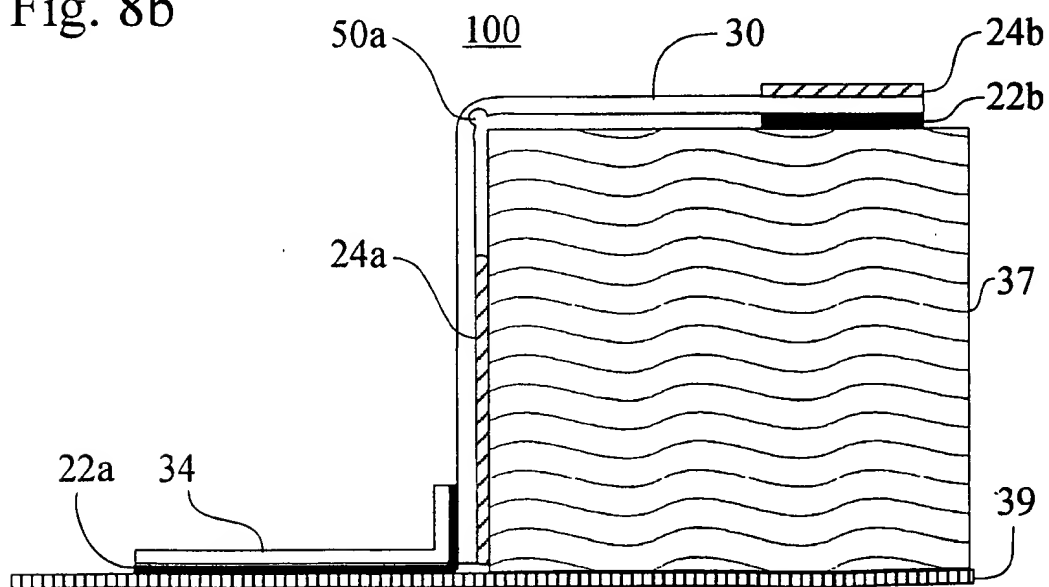


Fig. 9a

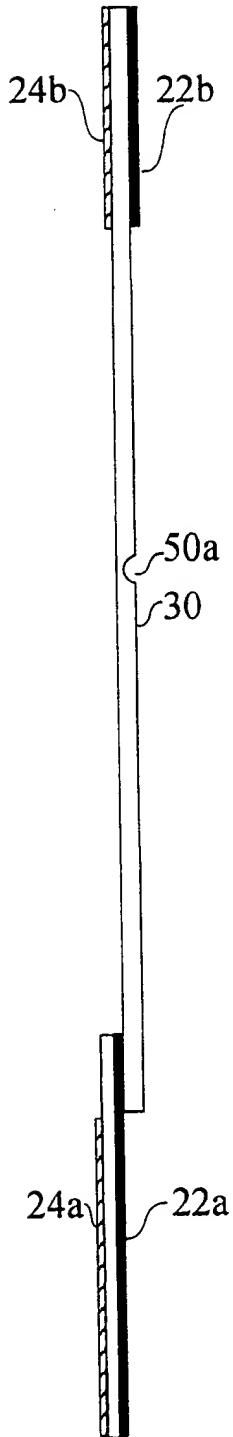


Fig. 9b

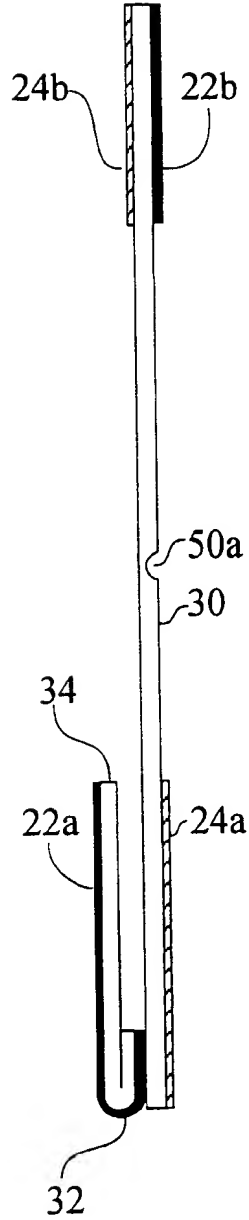


Fig. 9c

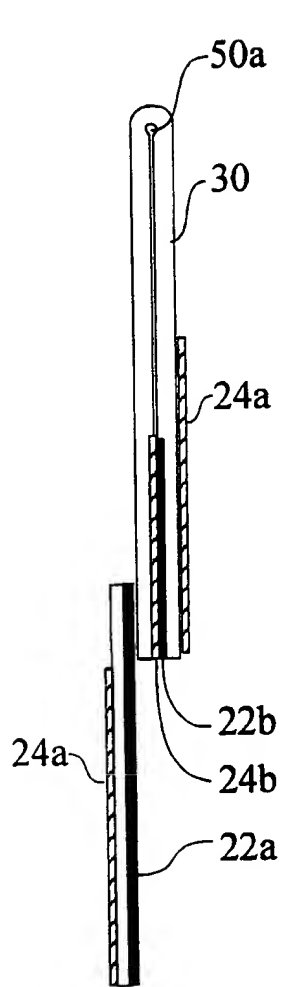
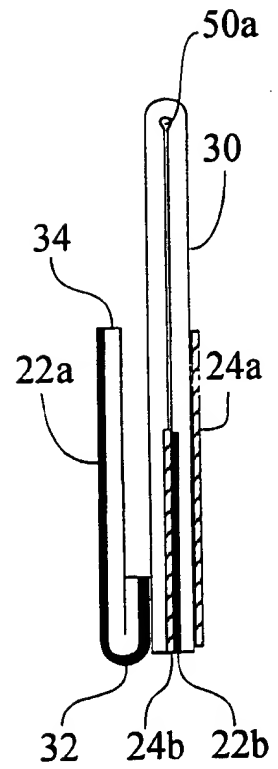
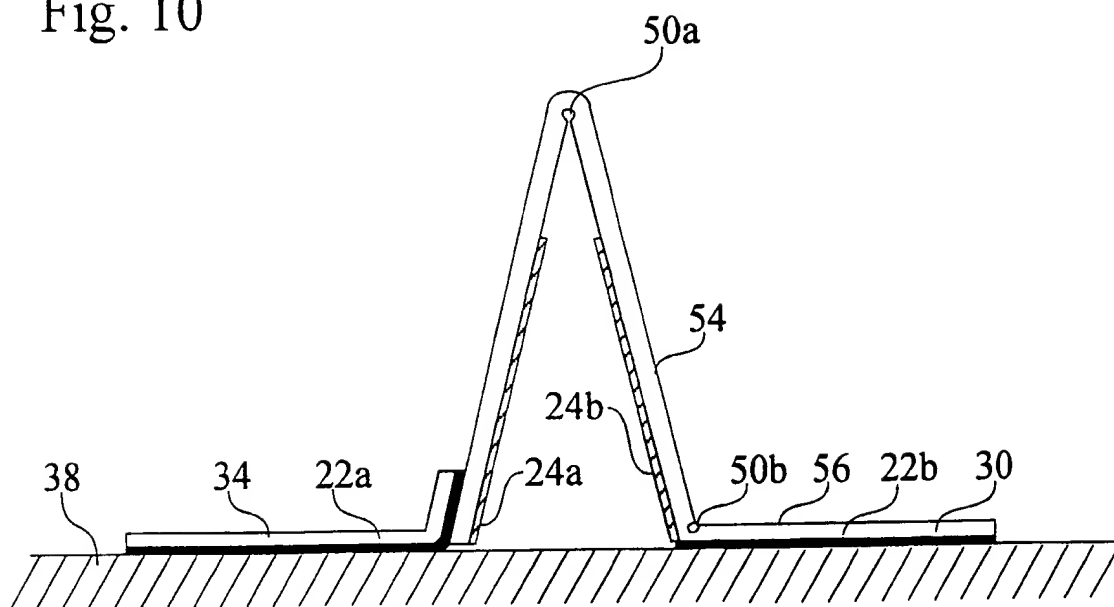


Fig. 9d



9/19

Fig. 10





10/19

Fig. 11a

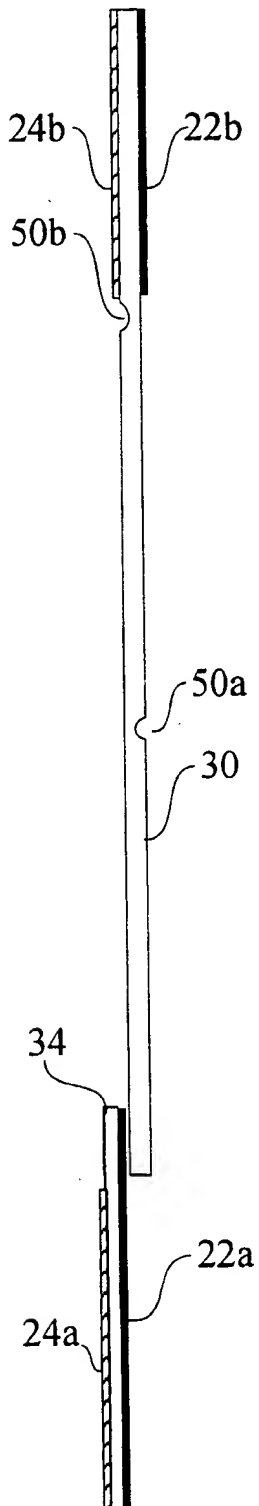


Fig. 11b

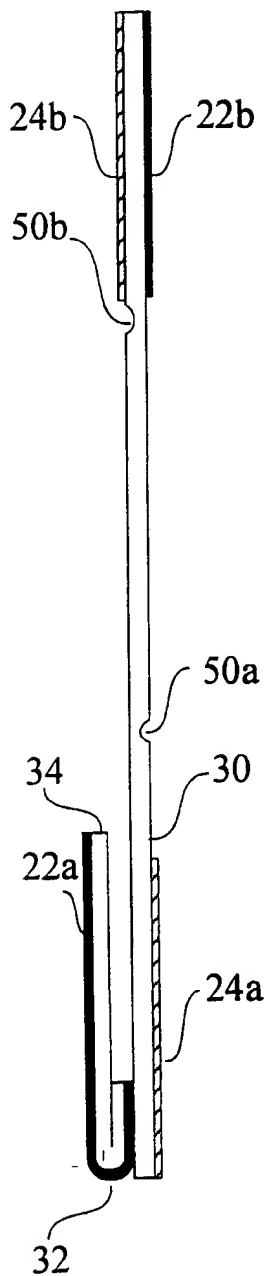
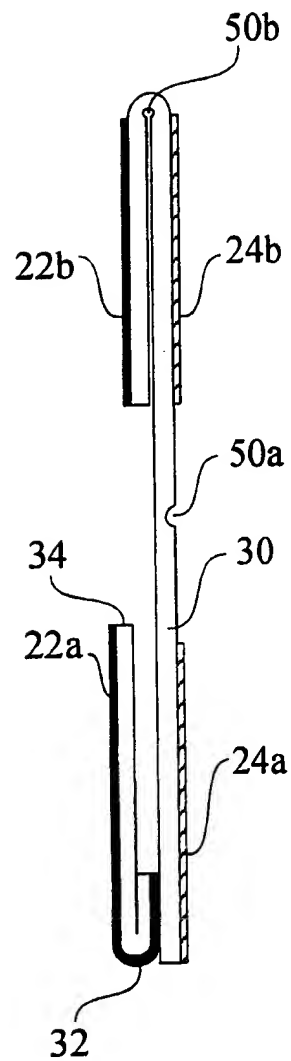


Fig. 11c



11/19

Fig. 11d

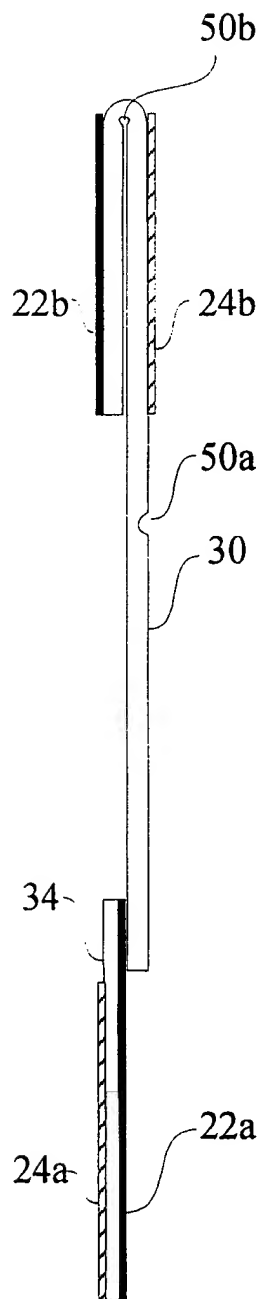


Fig. 11e

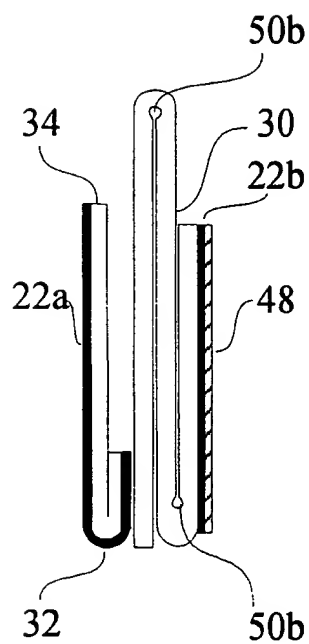
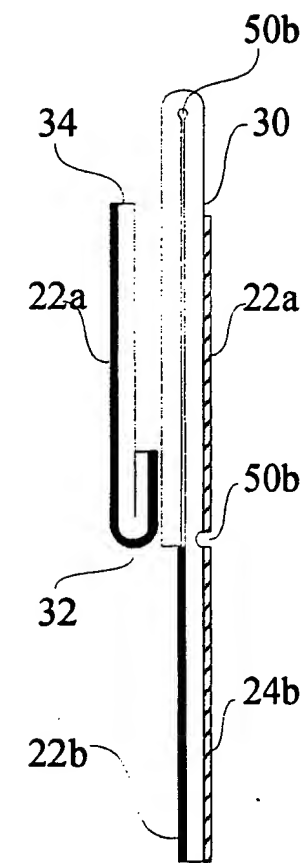


Fig. 11f



12/19

Fig. 12

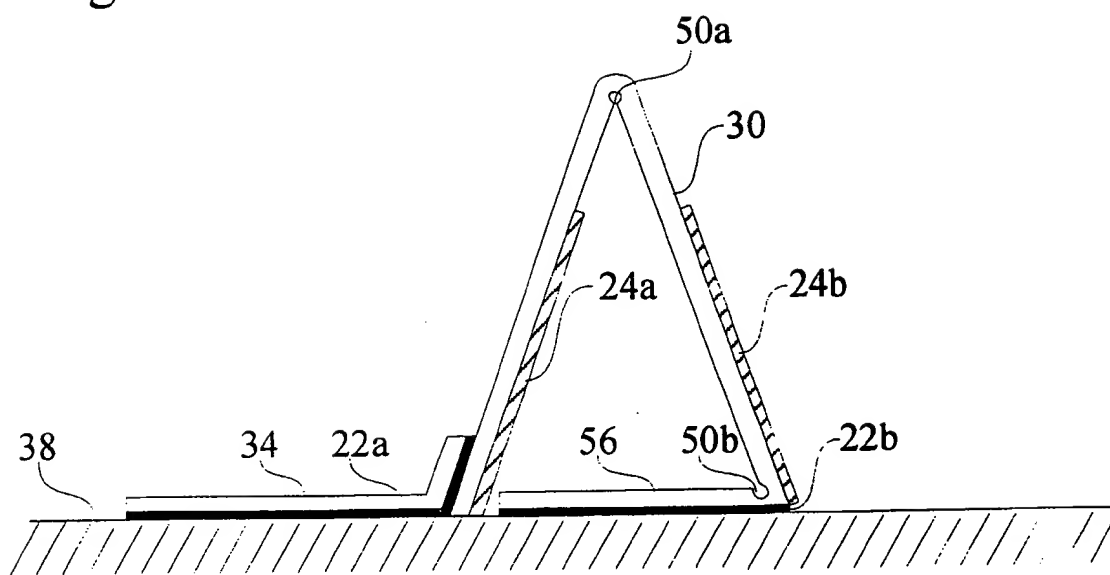


Fig. 13a

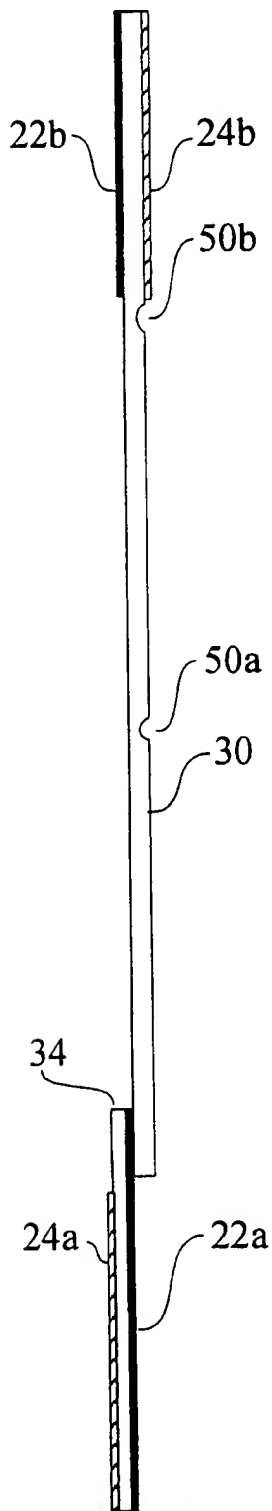


Fig. 13b

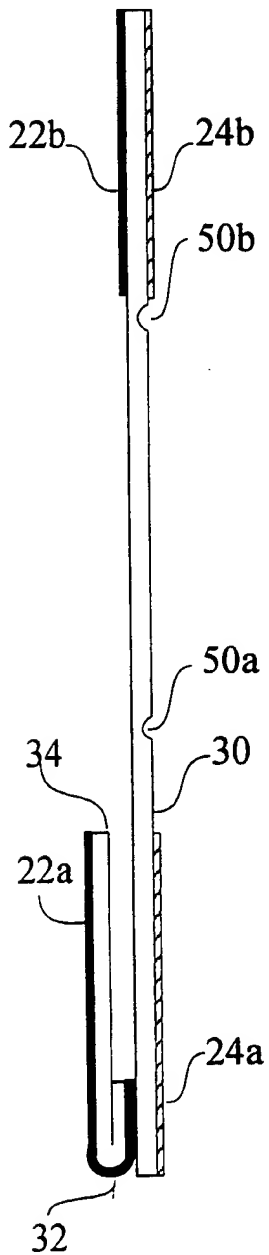


Fig. 13c

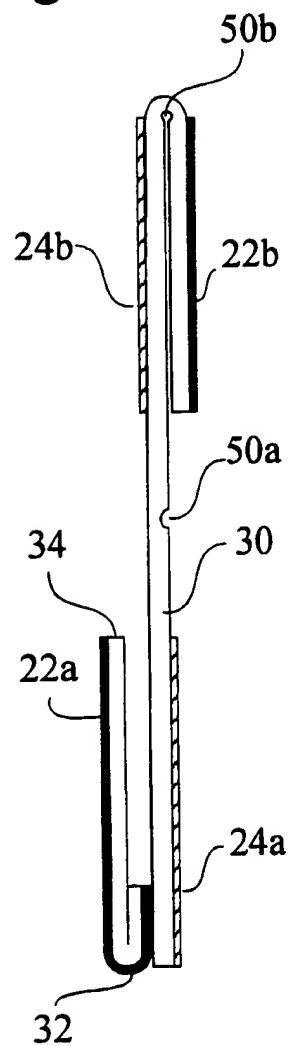


Fig. 13d

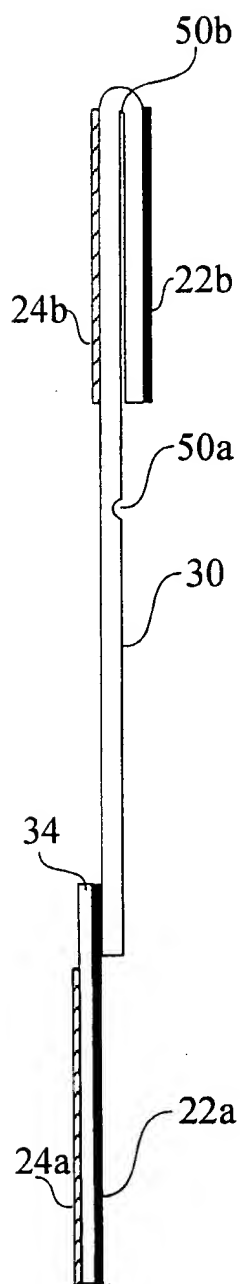


Fig. 13e

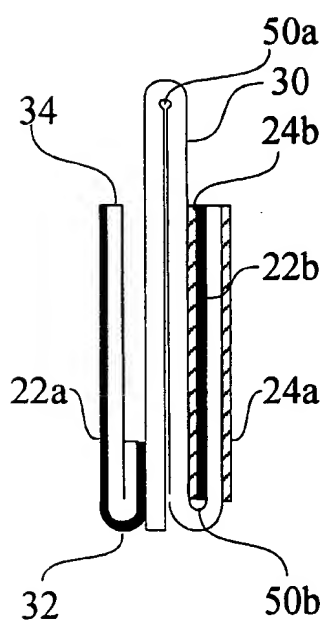
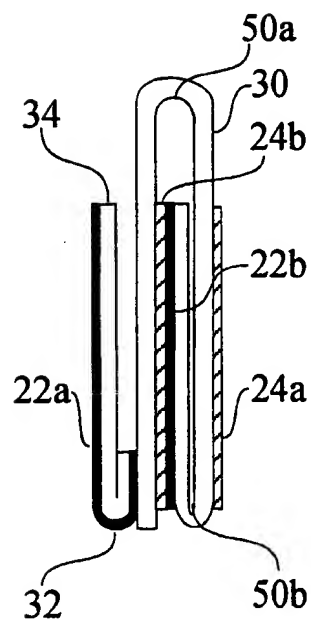
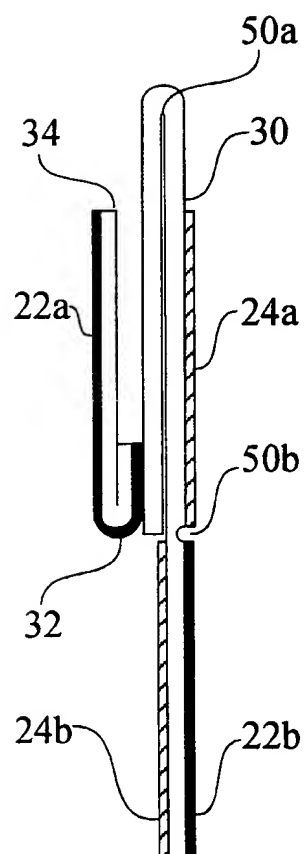


Fig. 13f



15/19

Fig. 13g



16/19

Fig. 14a

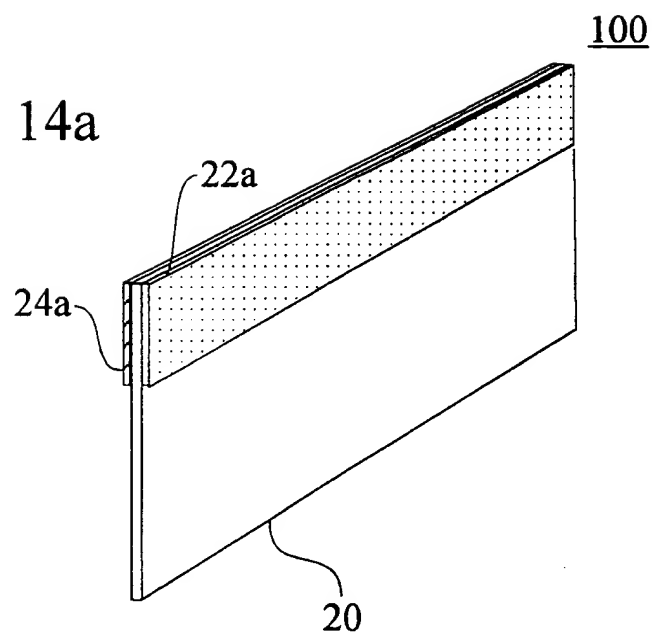
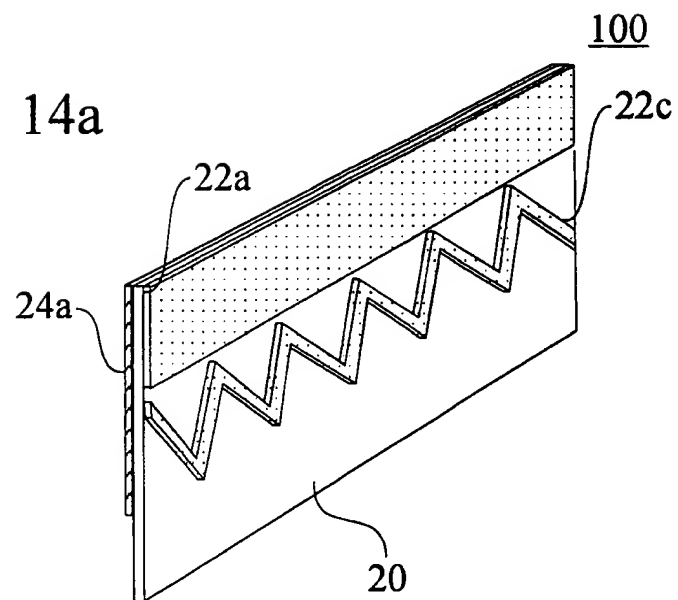


Fig. 14a



17/19

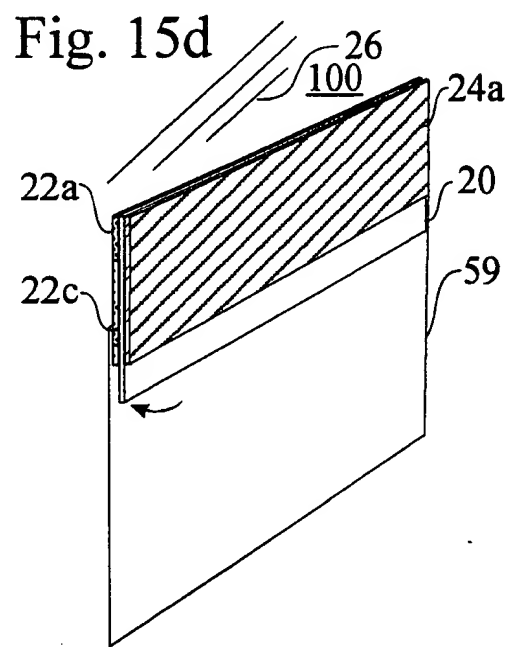
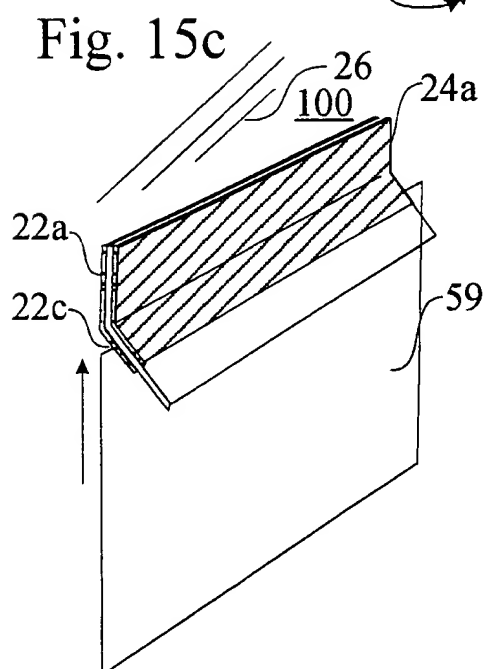
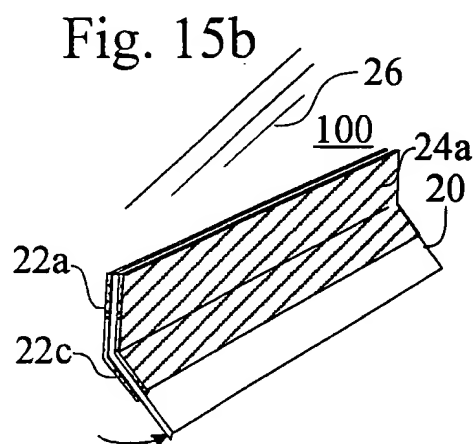
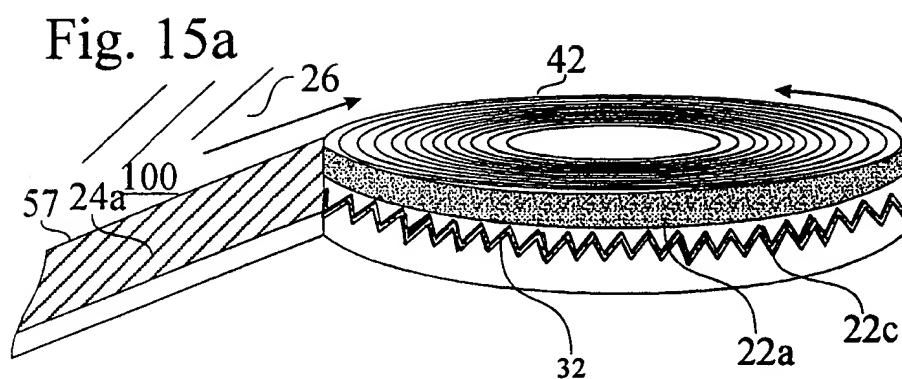




Fig. 16a

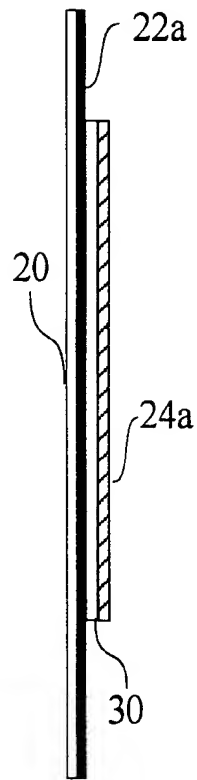


Fig. 16b

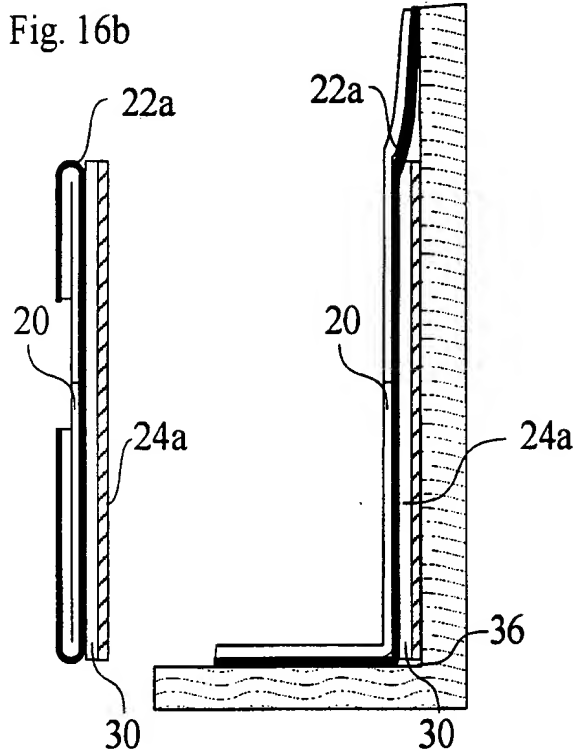


Fig. 16c

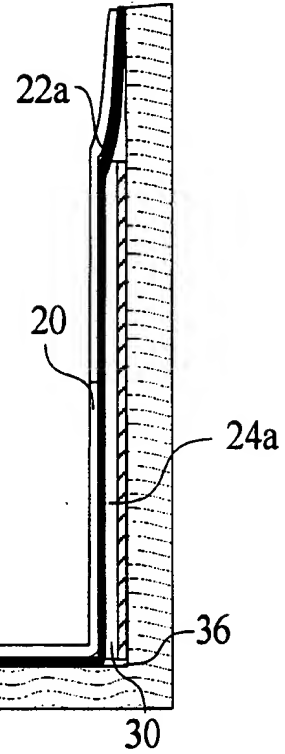


Fig. 16d

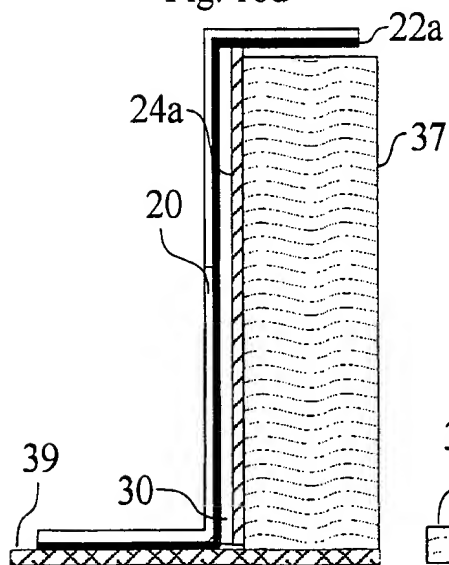


Fig. 16e

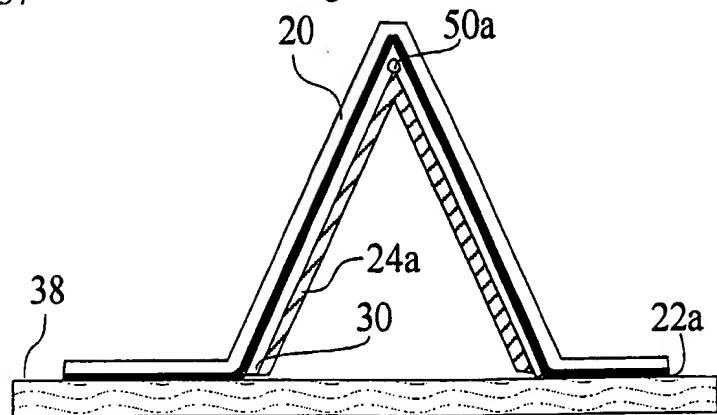


Fig. 17a

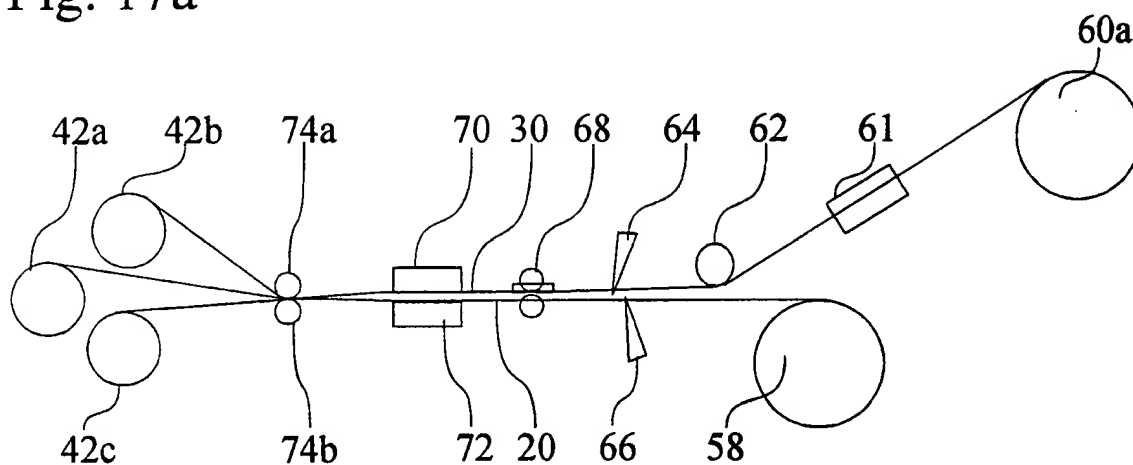
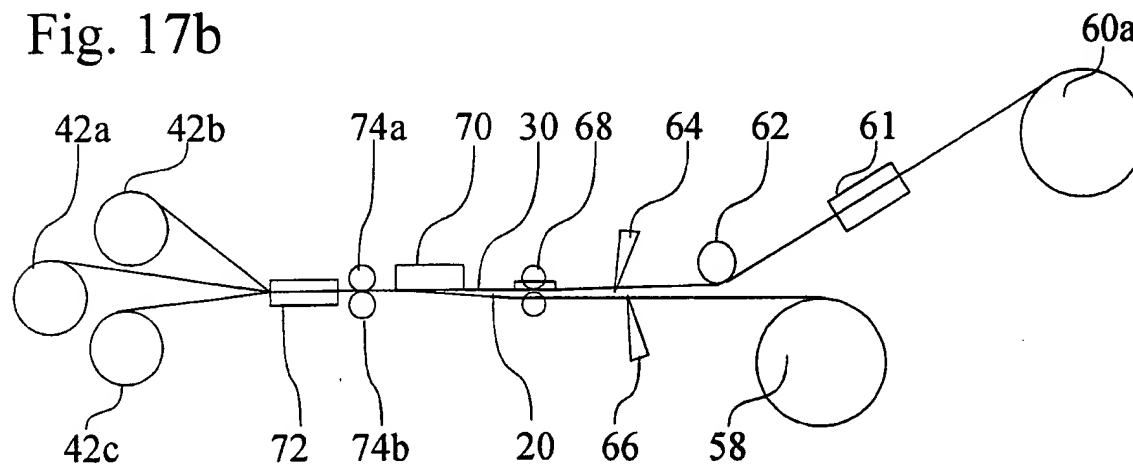


Fig. 17b



## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/27891

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : B05D 1/32; B32B 3/02,3/04

US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 118/504, 505; 427/208.4, 282; 428/40.1, 121, 124, 192, 194, 212, 343, 352, 354, 906

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 3,032,181 A (HUTTER et al) 01 May 1962, see drawings and columns 1-3.	1-3 and 7-11
Y	US 4,889,759 A (YAMAZAKI) 26 December 1989, See figures 1-3 and column 1, lines 40-46.	1, 4-6, 100, 12-44
Y	US 4,263,347 A (BANTA) 21 April 1981, See figure-1 and column 8, lines 16-46.	1, 4-6, 100, 12-44
Y	US 5,354,614 A (COX et al) 11 October 1994, see figures 1-2.	1-44

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

04 AUGUST 1999

Date of mailing of the international search report

27 AUG 1999

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

NASSER AHMAD

Telephone No. (703) 308-0661

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/27891

A. CLASSIFICATION OF SUBJECT MATTER:  
US CL :

118/504, 505; 427/208.4, 282; 428/40.1, 121, 124, 192, 194, 212, 343, 352, 354, 906